

FREQUENCY VARIATION OF SNOW DEPTHS IN THE MISSOURI AND UPPER MISSISSIPPI BASINS

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[Manuscript received May 13, 1953]

The accumulated depth of snow is a weather element not usually summarized in Weather Bureau climatological publications. Recently certain snow-depth frequencies were compiled for a number of first-order Weather Bureau stations in or near the drainage area above St. Louis, Mo., in connection with a study of the flood potential at St. Louis. The snow-depth frequencies are presented in table 1, for the benefit of others who may have use for these data.

Daily accumulated depths of snow on the ground (in inches) were taken from W. B. Form 1001, "Original Monthly Record of Observations," and were plotted against day of the year. Smooth curves were drawn, one enveloping all the points, one enveloping 95 percent, and another enveloping 90 percent. To construct the latter two curves, 10-day periods were considered as units. Except for minor adjustments for smoothing, the number of dots within a 10-day period (February 1-10, 11-20, etc.)

lying above the 90 percent curve (exceeded 1 year in 10) equalled the number of years of record, with half that many dots above the 95 percent curve (exceeded 1 year in 20). Depths were read from the curves at 10-day intervals, and are presented in table 1. Traces were not considered and were plotted as zeros. Therefore, the zeros in the table should be interpreted as less than 0.1 inch. Since there is considerable variation from station to station when these data are plotted on maps, and since such maps are not readily subject to a logical analysis, this form of presentation was discarded.

Appreciation is expressed to the National Weather Records Center which furnished a large number of photostats and to Margaret E. Linehan, A. E. Brown, A. L. Criss, J. L. Keister, J. T. Lindgren, and H. H. Vinnedge of the Hydrometeorological Section staff who took part in processing the data.

TABLE 1.—Depths of snow on ground (inches) exceeded 10 percent and 5 percent of the years on certain dates, and maximum snow-depth values for those dates

Station	Years	February 10			February 20			February 28			March 10			March 20			March 31			April 10			April 20			April 30		
		10%	5%	Max.	10%	5%	Max.	10%	5%	Max.	10%	5%	Max.	10%	5%	Max.	10%	5%	Max.	10%	5%	Max.	10%	5%	Max.			
Cairo, Ill.	1893-1948	0.5	1.6	9.7	0	0.7	8.9	0	0	7.7	0	0	5.7	0	0	3.2	0	0	1.0	0	0	0.4	0	0	0.2	0	0	
Charles City, Iowa	1905-48	11.5	16.6	22.4	9.0	17.0	26.9	7.0	12.5	29.3	4.5	7.0	23.5	1.9	4.2	17.0	0	1.6	11.0	0	0	6.1	0	0	2.5	0	0	
Columbia, Mo.	1893-1948	3.0	5.6	10.8	3.0	6.2	12.5	1.4	3.4	13.0	0	1.4	12.9	0	0	11.9	0	0	9.4	0	0	4.4	0	0	0	0	0	
Davenport, Iowa	1893-1948	6.8	8.8	14.4	3.7	6.3	13.9	2.5	4.1	13.3	1.8	3.1	12.5	0.5	1.8	11.6	0	0.4	10.2	0	0	8.4	0	0	5.0	0	0	
Des Moines, Iowa	1893-1948	6.4	9.0	21.5	3.9	7.9	20.9	2.9	6.9	19.8	2.0	5.1	17.4	0.8	2.7	14.4	0	0.8	11.0	0	0	9.4	0	0	8.4	0	6.7	
Devils Lake, N. Dak.	1905-46	11.7	14.3	30.0	11.8	14.7	27.8	10.7	14.0	25.5	7.3	11.0	21.5	4.2	6.9	17.8	1.8	3.5	14.0	2	1.2	10.8	0	0	7.5	0	4.6	
Dodge City, Kans.	1893-1948	0.9	2.4	6.8	1.1	3.4	13.7	1.2	4.4	15.2	0	4.6	15.5	0	0	15.0	0	0	13.5	0	0	11.5	0	0	8.3	0	0	
Dubuque, Iowa	1893-1948	8.6	12.9	26.8	6.4	11.6	21.7	4.5	7.1	18.4	3.0	4.6	15.0	1.7	3.1	12.6	0	1.3	10.1	0	0	7.4	0	0	4.4	0	1.0	
Ellendale, N. Dak.	1918-33	9.4	10.6	15.0	8.8	11.2	16.4	5.2	11.2	14.9	1.9	5.1	12.2	0.9	2.0	9.7	0.4	1.2	6.8	0	0.7	4.2	0	0	2.2	0	1.1	
Grand Forks, N. Dak.	1914-48	16.9	18.1	22.9	17.2	18.5	23.4	15.7	19.0	23.9	12.4	18.5	24.1	7.8	12.3	17.2	3.3	5.0	11.3	1	1.5	7.3	0	0	4.7	0	3.2	
Hannibal, Mo.	1893-1933	4.0	7.7	15.0	1.0	7.5	16.8	0.8	2.0	17.0	0.7	2.4	16.2	0	0.8	14.6	0	0.1	12.2	0	0	6.5	0	0	1.5	0	0	
Iola, Kans.	1906-36	0.4	1.2	10.7	0	0.9	11.8	0.1	1.7	12.0	0	2.0	11.7	0	0	10.7	0	0	5.2	0	0	0	0	0	0	0	0	
Kansas City, Mo.	1893-1943	2.8	4.8	14.9	1.4	4.2	15.6	0.7	2.4	16.4	0.2	2.6	18.0	0	0.8	19.8	0	0.1	16.5	0	0	7.0	0	0	4.2	0	2.2	
Keokuk, Iowa	1893-1941	4.7	8.7	12.8	3.0	8.7	13.0	1.3	3.2	13.0	0	1.5	12.9	0	0.6	12.7	0	0	12.3	0	0	3.5	0	0	0.4	0	0	
LaCrosse, Wis.	1893-1948	12.8	16.9	28.5	11.0	14.3	28.3	9.1	11.7	27.8	5.3	8.3	16.1	2.7	5.1	14.0	0	2.4	12.7	0	0	1.1	0	0	8.3	0	2.0	
Lincoln, Nebr.	1897-1948	5.0	7.3	16.9	3.3	7.4	17.3	2.7	7.3	17.2	2.5	6.8	16.7	0.5	2.2	11.8	0	0.2	8.4	0	0	6.4	0	0	4.2	0	0	
Madison, Wis.	1905-48	13.3	16.7	21.9	9.5	16.2	22.2	7.7	10.8	20.2	5.6	7.5	17.3	3.2	5.8	15.0	0.7	3.2	12.9	0	0.8	11.4	0	0	8.7	0	3.8	
Minneapolis, Minn.	1899-1948	12.9	14.2	21.8	12.0	13.8	29.9	9.8	13.2	32.2	6.6	10.0	32.4	2.7	6.9	28.0	0.8	2.7	13.2	0	0.4	11.2	0	0	9.7	0	6.7	
Moorhead, Minn.	1893-1938	15.3	17.7	26.1	15.0	17.6	26.9	12.4	17.5	27.5	8.8	12.3	27.8	7.0	9.7	26.0	2.2	5.4	17.8	4	1.5	12.3	0	0.3	6.9	0	3.5	
North Platte, Nebr.	1893-1948	2.7	3.5	13.2	1.6	2.9	14.1	1.6	3.1	14.4	1.3	3.3	14.2	0.7	2.8	12.9	0	1.8	7.5	0	0	5.6	0	0	4.2	0	3.1	
Omaha, Nebr.	1893-1943	5.3	8.3	19.6	4.4	7.7	19.9	4.2	6.2	19.9	3.1	5.8	19.5	1.6	2.9	14.8	0	0.5	8.6	0	0	4.9	0	0	2.4	0	0	
Peoria, Ill.	1905-48	3.3	5.9	11.2	1.5	4.0	11.1	0.9	2.3	10.8	0.4	2.0	10.4	0	0.6	9.7	0	0.1	8.4	0	0	4.5	0	0	1.3	0	0	
Pierre, S. Dak.	1893-1933	4.6	6.2	12.0	3.1	4.3	11.9	2.9	6.0	11.7	3.9	6.7	11.4	2.9	5.4	10.8	0.9	2.1	9.9	0	0.1	8.4	0	0	6.0	0	0	
Rapid City, S. Dak.	1893-1948	2.8	4.9	12.2	2.6	4.1	12.4	2.6	3.5	12.8	2.0	4.9	13.5	2.9	5.2	14.5	1.7	4.3	17.0	0	2.2	17.7	0	0.2	10.0	0	4.9	
St. Louis, Mo.	1893-1947	1.8	3.4	15.3	1.6	3.3	15.6	0.7	2.1	15.3	0	1.0	12.8	0	0.3	10.1	0	0	7.4	0	0	5.2	0	0	2.6	0	0	
St. Paul, Minn.	1893-1933	14.0	16.5	34.0	13.3	15.4	34.7	12.3	14.0	32.9	8.3	12.1	29.4	2.3	7.2	23.5	0.7	2.8	17.4	0	0.9	13.9	0	0	11.0	0	7.4	
Sioux City, Iowa	1893-1948	6.7	10.0	26.0	4.0	6.3	26.3	3.0	4.7	26.2	1.9	3.5	25.9	0.8	2.3	25.3	0.1	0.8	24.1	0	0	20.0	0	0	4.8	0	3.0	
Springfield, Ill.	1893-1948	2.9	5.4	13.2	1.7	5.2	13.7	0.8	2.5	13.7	1.1	1.3	13.4	0	0.6	11.5	0	0	6.4	0	0	4.1	0	0	2.2	0	2.2	
Springfield, Mo.	1893-1948	1.8	3.8	15.1	1.7	3.7	20.0	0.5	2.2	18.9	0.1	1.2	15.0	0	0.1	10.1	0	0	4.5	0	0	2.3	0	0	0.7	0	0	
St. Joseph, Mo.	1910-43	2.6	5.4	10.7	2.6	5.7	11.3	3.1	5.9	11.5	0.1	1.7	11.4	0	0.1	10.9	0	0	9.8	0	0	8.1	0	0	0	0	0	
Topeka, Kans.	1899-1943	3.7	5.1	17.8	1.2	4.8	18.5	1.2	4.9	18.6	0.9	2.7	18.2	0	0.8	17.2	0	0	14.7	0	0	3.4	0	0	1.4	0	0.2	
Valentine, Nebr.	{ 1893-94 1901-48 }	3.3	5.6	29.0	3.3	6.9	29.2	3.5	7.9	29.1	3.8	7.8	28.8	3.6	6.6	28.3	0.8	2.8	27.7	0	0.6	28.9	0	0	17.0	0	7.1	
Wausau, Wis.	1916-33	20.8	21.7	25.0	20.7	22.6	26.0	20.4	24.0	26.5	16.5	21.8	24.6	6.7	9.7	18.0	3.6	5.3	13.7	2.0	3.8	11.0	0	0	6.0	0	0	
Wichita, Kans.	1893-1948	0.6	2.0	7.4	0.3	1.7	8.1	0.3	1.7	8.4	0.4	1.9	8.5	0	0.5	8.3	0	0	7.4	0	0	2.8	0	0	0.8	0	0	
Williston, N. Dak.	1894-1948	10.3	15.3	18.8	9.0	15.1	20.4	7.4	10.4	22.6	6.2	9.7	28.0	6.2	9.8	28.0	3.0	6.1	25.4	0	2.2	21.0	0	0	17.1	0	13.6	
Yankton, S. Dak.	1893-1933	7.4	11.5	21.8	4.4	7.1	21.1	2.9	5.5	20.0	3.0	5.3	16.2	1.9	5.2	13.4	0	1.2	11.8	0	0	10.0	0	0	7.2	0	4.0	